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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/816,603	03/23/2001	Mark Lynn Jenson	1327.009US1	6175

7590 01/22/2003

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EXAMINER
ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
1745	4

DATE MAILED: 01/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-4

Office Action Summary	Application No.	Applicant(s)	
	09/816,603	JENSON, MARK LYNN	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 December 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-41* is/are pending in the application.

4a) Of the above claim(s) *13,16,17,25-30,34-38 and 41* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11,12,14,15,18-24,31-33,39 and 40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *1* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group 2 (claims 11-31) in Paper No. 3 is acknowledged.

2. It is also noted that applicant did not elect a single claimed species as identified in the Restriction Requirement, *paper # 2*. Accordingly, in order to expedite the prosecution of the instant application, a telephone call was made to Charles A. Lemaire on 01/13/03 to request an oral election to the foregoing restriction requirement as applicable to *the Election of Species*. It resulted that applicant further elected *Species 1- a photovoltaic cell on the battery*. Thus, an action as to this particular merit follows.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 11-12, 14-15, 18-20, 31 and 33 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The language "ion-assist energy" in claims 11 and 33 is of uncertain meaning, thereby rendering the claim vague. Further, the language "ion-assist energy" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is uncertain as to what is particularly intended to recite by the term "ion-assist".

6. Claim 33 recites the limitations "a substrate having a major surface area" in line 2, and "the substrate" in line 3. There is insufficient antecedent basis for this limitation in the claim. Claim 11 contains an earlier recitation of both limitations, therefore, it is unclear whether the limitations of claim 33 refer to a second substrate therein or to the same substrate as in claim 1.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 11-12, 14-15, 18-24, 31, 33 and 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al 5411592 in view of Bates et al 5338625.

The instant application is directed to system for making a thin-film device wherein the claimed inventive concept comprises the specific deposition means (station) that deposits the layers. Other limitations include: the photovoltaic cell on the battery; the motion device, the rolled flexible material; the rigid material; the polymer; the layer energizing; the continuous plastic sheet and wafers; the energy conversion device; the specific layer material; and the second substrate means.

<u>With respect to claims 11, 21, 22 and 31:</u>

Ovshinsky et al disclose an apparatus for deposition of thin-film solid state batteries (title) comprising a multi-chambered deposition apparatus for depositing battery materials onto substrate material (abstract/col 6, lines 25-43). The apparatus includes at least three distinct

evacuable deposition chambers, interconnected in series; the first deposition chamber is adapted to deposit a layer of battery electrode material onto the substrate (abstract/col 6, lines 25-43). The second deposition chamber is adapted to deposit a layer of electrolyte material onto the layer of the battery electrode material deposited in the first chamber. The third deposition chamber is adapted to deposit another layer of battery electrode material onto the electrolyte layer (abstract/ col 6, lines 25-43). Initially, the substrate passes to the first deposition chamber then it is transported to the second chamber, next the substrate is passed through another gas gate into the third deposition chamber (col 11, lines 58 to col 12, line 7). *Thus, the process is continuous.*

Each electrochemical cell includes a thin-film negative electrode layer, a thin-film positive electrode layer and a thin-film electrolyte layer (col 9, lines 25-28). The chambers are specifically adapted to deposit battery materials onto the substrate (col 11, lines 50-58). *The energy conversion device is the battery itself which is being deposited over the substrate in the form of different layers.*

The deposition chambers are preferably adapted to deposit materials by at least one method selected from the group consisting of chemical vapor deposition, microwave plasma enhanced chemical vapor deposition, sputtering, laser ablation among them (col 7, lines 65 to col 8, line 3). *It is noted that sputtering and laser ablation are ion-assist energy deposition techniques.*

As to claim 12:

It is disclosed that a product variation is the deposition of the thin-film batteries onto substrates on the opposite side of thin-film silicon solar cells (photovoltaic cells) to integrate the collection and storage of solar energy (col 11, lines 39-43).

As to claim 14:

It is disclosed that the chambers are physically interconnected in series (col 6, lines 29-31) and the deposition chambers are interconnected by gas gates such that the substrate material is allowed to proceed from one deposition chamber to the next, while maintaining gaseous segregation between the chambers (col 6, lines 40-44).

In reference to claim 15:

It is taught that a third embodiment comprises an evacuable payout chamber which is physically connected in series to the first deposition chamber; the payout chamber holds a roll of substrate material (flexible material as it has been rolled) which is unrolled and passed to the first deposition chamber (col 6, line 65 to col 7, line 2).

On the matter of claims 18-19, 23 and 39:

Ovshinsky et al disclose that the substrate may be formed from an electrically conductive metal (rigid material) or from an electrically insulating polymer (col 9, lines 3-6). *Thus, the rolled substrate material is understood to be a continuous plastic sheet.* The use of an elongated web of substrate material is disclosed (col 13, lines 13-17).

With respect to claims 24 and 40:

It is disclosed that a second embodiment comprises a deposition apparatus for depositing single or multi-celled batteries upon precut substrates (wafers), that is a substrate which is of relatively limited length and width dimensions when compared to rolls of substrate web which can be as long as 2000 ft or more (col 12, lines 35-46).

As far as claim 32 (see also rejection below):

Ovshinsky et al disclose that for lithium ion system, the positive electrode layer can be formed from a material such as metal oxides and lithiated metal oxides compound such as $LiCoO_4$ (col 10, lines 30-34).

Regarding claim 33:

It is disclosed that a second embodiment comprises an apparatus including an substrate insertion chamber which is physically interconnected in series to the first deposition chamber; the insertion chamber is adapted to hold one or more individual substrates and pass them to the first deposition chamber (col 6, lines 44-64).

Ovshinsky et al disclose an apparatus for deposition of thin-film batteries according to the foregoing. However, Ovshinsky et al do not expressly disclose the deposition station supplying the amount of ion-assist energy to aid in crystalline layer formation while controlling stoichiometry of the crystalline layer and the specific ion energy.

As to claims 11, 20, 21, 22:

Bates et al disclose a thin-film battery and method for making same wherein it is disclosed that the performance of the lithium battery is very dependent on formation of the cathode. Consideration of the microstructure of the cathode is equally important as consideration of the composition; typical is the use of cathodes having a characteristic crystalline microstructure which is dependent on the substrate temperature, extent of the erosion of the target material due to prior sputtering and the pressure and composition of the process gas during deposition (col 5, lines 25-34). At certain substrate temperatures, the battery cathodes consist of crystalline pellets while films deposited onto substrates consist of clusters of crystalline fibrous bundles (col 5, lines 35-39).

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to use specific deposition station supplying the specific amount of ion-assist energy to aid in crystalline layer formation while controlling stoichiometry of the crystalline layer in the system of Ovshinsky et al as Bates et al disclose that that the performance of the lithium battery is very dependent on formation of the cathode wherein consideration of the microstructure of the cathode is equally important as consideration of the composition. It is typical to use cathodes having a characteristic crystalline microstructure which is dependent on the process substrate temperature, extent of the erosion of the target material due to prior sputtering and the pressure and composition of the process gas during deposition per se. Thus, those of ordinary skilled in the art can appreciate that by controlling and applying specific energy magnitudes onto the substrate material a crystalline substrate material formation is obtained, and thus, the performance of the battery is enhanced, and a cell of much higher capacity is also obtained. Further, since Bates et al also disclose that when deposited from an eroded target, the cathode films where characterized by a high density of micron-sized fibrous cluster of the specific crystalline compound, it would be obvious to recognize that specific ion-energy is to be applied thereon depending on the specific material composition and deposition techniques.

9. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al 5411592 in view of Bates et al 5338625 as applied to claim 11 above, and further in view of Matsui et al 5558953.

Ovshinsky et al and Bates et al are applied, argued and incorporated herein for the reasons above. In addition, the preceding references do not disclose the specific material $LiCoO_2$.

Matsui et al disclose that as a positive electrode (cathode) of the lithium battery, it is preferable to use an active material such as $LiCoO_2$ (col 4, lines 48-57).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific material $LiCoO_2$ to form the second layer of the layer-deposited battery of Ovshinsky et al and Bates et al as Matsui et al disclose that it is preferable to use $LiCoO_2$ as an active material because such a compound is capable of imparting a discharge voltage of 4V level.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745

Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700